



UNITED STATES PATENT AND TRADEMARK OFFICE

A

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---------------------|-------------|----------------------|---------------------|------------------|
| 09/919,845 | 08/02/2001 | Sharon Barkai | 1031-US | 5670 |
| 24505 | 7590 | 03/09/2006 | EXAMINER | |
| DANIEL J SWIRSKY | | | MAIS, MARK A | |
| 55 REUVEN ST. | | | ART UNIT | |
| BEIT SHEMESH, 99544 | | | PAPER NUMBER | |
| ISRAEL | | | 2664 | |

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/919,845

Applicant(s)

BARKAI ET AL.

Examiner

Mark A. Mais

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawing (Fig. 3) was received on January 31, 2006. This drawing is acceptable.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Art Unit: 2616

3. Claims 1, 2 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhang et al. (USP 6,687,748).

4. With regard to claims 1 and 8, Zhang et al. discloses determining a communications path in a computer network the method comprising:

sending a simulated network message within a model of said computer network [**packet-switched (col. 8, lines 1-2) alarm signals, col. 4, lines 27-35]** from a source device component within the model [**Fig. 1, network management server 12, col. 3, lines 10-22]** to a destination device component within said model [**Fig. 1, virtual network device (VND) 38, col. 4, lines 6-13]** along a device component path [**Fig. 1, the path between network management server 12 and VND 38]**,

wherein the message [**alarm signals]** does not traverse the computer network [**Fig. 1, computer network is interpreted by the examiner as the combination of the “real” network 14 connected to network management server 12 and “real” network devices 16; thus, the alarm signals only traverse the path between VND 38 and network management server 12 and NOT to network devices 16]** and

recording the device components traversed by the message, thereby determining communications path as well as the validity of the path [**interpreted by the examiner as recording the traversed VNDs 38 onto the management information base (MIB) 68, when simulation device 18 acts as a virtual device (e.g., a router 36) and records such information as [routing] tables associated with VNDs 38, as well as the status of input/output interfaces [devices] associated with, and communicated to, communication device [router] 36, col. 5,**

Art Unit: 2616

lines 26-33 and 50-60; while network management server 12 “sees” multiple virtual network devices using multiple virtual network addresses, col. 8, lines 34-35 and col. 10, lines 39-49].

5. With regard to claim 2, Zhang et al. discloses further comprising

providing the model with a plurality of agents [**Fig. 1, simulation devices 18, col. 8, lines 40-41; wherein multiple simulation devices receive requests from network management server 12 and simulates the operation of network devices 16, col. 10, lines 26-49]**

each agent [**Fig. 1, simulation devices 18]** corresponding to a destination network element [**Fig. 1, any one of multiple network devices 16 can be a one of many network devices to include routers, bridges, etc., col. 3, lines 10-16]** of said computer network comprising a plurality of network elements [**Fig. 1, multiple network devices 16]**, and

a plurality of device components (DC) [**Fig. 1, each simulation device 18 comprises multiple VNDs 38]**, each of said device components [**Fig. 1, multiple VNDs 38]** modeling at least one aspect of one of said network elements, said aspect being either of a physical and a functional characteristic of said network element [**each VND 38 is managed by network management server 12 as though it is a physical network device 16, col. 4, lines 11-13; see also communication device 36 can be configured as a router or any other type of network device in order to communicate with the “virtual” network on behalf of the simulation device 18, col. 5, lines 26-33]**,

Art Unit: 2616

wherein each of said agents [**multiple simulation devices 18, col. 8, lines 40-41;**
wherein the simulation devices 18 receive requests from network management server 12
and simulates the operation of network devices 16, col. 10, lines 26-49] comprises a plurality
of said device components [**Fig. 1, multiple VNDs 38**], and

wherein at least two of said device components [**Fig. 1, multiple VNDs 38**] within at
least one of said agents [**Fig. 1, simulation devices 18**] are logically interconnected, each logical
interconnection corresponding to either of a physical and a functional interconnection found
within or between any of said network elements [**multiple VNDs 38 are shown in simulation**
device 18 wherein each VND 38 is managed as physical network device 16; for example a
router and a server, col. 3, lines 10-16].

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness
rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
such that the subject matter as a whole would have been obvious at the time the invention was made to a person
having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the
manner in which the invention was made.

7. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. as
applied to claims 1, 2, and 8 above, and further in view of Hao et al. (USP 6,728,214).

Art Unit: 2616

8. With regard to claims 3-4, Zhang et al. discloses a that the sending step [**packet-switched (col. 8, lines 1-2) alarm signals, col. 4, lines 27-35]** comprises each device component along the device component path traversed by the message [**multiple simulation devices 18 use multiple virtual addresses such that multiple alarm signals are sent to network management server 12, col. 11, lines 4-15]**. Zhang et al. discloses that the simulated device components can be routers [**col. 3, lines 10-16]**.

Zhang et al. does not specifically disclose identifying an intermediate device component along the device component path to which the message is to be passed and passing the message and an identifier of the intermediate device component to an immediately next device component in accordance with network routing rules. However, Hao et al. discloses testing network routers by simulating the network topologies [**see Title and Abstract]**. Hao et al. randomly inserts/deletes either an edge (connection), router-node or network node, checks the network topology and routing tables, and further checks the packet forwarding behavior [**col. 4, line 54 to col. 5, line 35; especially with IP protocols such RIP, OSPF, and BGP, col. 5, lines 38-40]**. A packet (such as an IP packet), sent from a first router, via a route containing multiple routers, must be received correctly by the destination router [**col. 7, lines 10-19]**. Since the router-under-test (RUT) has a changing network topology, it must constantly simulate updating the presence of device components [e.g., routing tables], then possibly the absence of device components via a network topology table [**col. 4, lines 30-36]** as if it were in a real network [**col. 3, lines 31-35]**, and, therefore, whether the tested router is complying with the network routing rules. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the router of Zhang et al. to include the specific functionality of the router-testing of

Art Unit: 2616

Hao et al. because such a testing method would allow the network management system to be properly tested for scalability, performance, and reliability while still not incurring the monetary and time burdens that accompany all the network devices in a network environment [see **Zhang et al., col. 1, lines 2, lines 13-25**].

9. With regard to claim 5, Zhang et al. discloses that the sending step [**packet-switched (col. 8, lines 1-2) alarm signals, col. 4, lines 27-35**] comprises each device component along the device component path traversed by the message [**multiple simulation devices 18 use multiple virtual addresses such that multiple alarm signals are sent to network management server 12, col. 11, lines 4-15**]. Zhang et al. discloses that the simulated device components can be routers [**col. 3, lines 10-16**].

Zhang et al. does not specifically disclose identifying the intermediate device component within the same network layer. However, Hao et al. discloses testing network routers by simulating the network topologies [see **Title and Abstract**]. Hao et al. randomly inserts/deletes either an edge (connection), router-node or network node, checks the network topology and routing tables, and further checks the packet forwarding behavior [**col. 4, line 54 to col. 5, line 35; especially with IP protocols such RIP, OSPF, and BGP, col. 5, lines 38-40**]. A packet (such as an IP packet), sent from a first router, via a route containing multiple routers, must be received correctly by the destination router [**col. 7, lines 10-19**]. Since the router-under-test (RUT) has a changing network topology, it must constantly simulate updating the presence of device components [e.g., routing tables], then possibly the absence of device components via a network topology table [**col. 4, lines 30-36**] as if it were in a real network [**col. 3, lines 31-35**],

Art Unit: 2616

and, therefore, whether the tested router is complying with the network routing rules. Thus, Hao et al. discloses identifying the intermediate device component within the same network layer because it inserts/deletes connections and then checks the network topology, routing tables, and checks packet forwarding [**col. 4, line 54 to col. 5, line 35; especially with IP protocols such RIP, OSPF, and BGP, col. 5, lines 38-40**]. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the router of Zhang et al. to include the specific functionality of the router-testing of Hao et al. because such a testing method would allow the network management system to be properly tested for scalability, performance, and reliability while still not incurring the monetary and time burdens that accompany all the network devices in a network environment [**see Zhang et al., col. 1, lines 2, lines 13-25**].

10. With regard to claim 6, Zhang et al. discloses that the sending step [**packet-switched (col. 8, lines 1-2) alarm signals, col. 4, lines 27-35**] comprises each device component along the device component path traversed by the message [**multiple simulation devices 18 use multiple virtual addresses such that multiple alarm signals are sent to network management server 12, col. 11, lines 4-15**]. Zhang et al. discloses that the simulated device components can be routers [**col. 3, lines 10-16**].

Zhang et al. does not specifically disclose receiving the message at the immediately next device component and performing different functions based on what network layer the next device component is in. However, Hao et al. discloses testing network routers by simulating the network topologies [**see Title and Abstract**]. Hao et al. randomly inserts/deletes either an edge (connection), router-node or network node, checks the network topology and routing tables, and

Art Unit: 2616

further checks the packet forwarding behavior [col. 4, line 54 to col. 5, line 35; especially with **IP protocols such RIP, OSPF, and BGP, col. 5, lines 38-40**]. A packet (such as an IP packet), sent from a first router, via a route containing multiple routers, must be received correctly by the destination router [col. 7, lines 10-19]. Since the router-under-test (RUT) has a changing network topology, it must constantly simulate updating the presence of device components [e.g., routing tables], then possibly the absence of device components via a network topology table [col. 4, lines 30-36] as if it were in a real network [col. 3, lines 31-35], and, therefore, whether the tested router is complying with the network routing rules.

Thus, Hao et al. discloses receiving the message at the immediately next device component [Fig. 12, **simulated network topology shows the multiples routers between the RUT and the further routers/networks**]; if the message is received from a device component at a higher network layer [**for BGP testing, the testing involves setting up a higher layer TCP connection, then sending update packets to the RUT, col. 11, lines 12-18**]; placing information onto an information stack as may be needed by any device component along the device component path to identify other device components along the device component path to which the message is to be passed [**Each BGP router maintains its preferred paths to all possible destinations (not necessarily the shortest path), the BGP router must advertise these paths to its adjacent multiple routers, col. 9, lines 48-53. Since the information identifying intermediate nodes is extracted via the virtual/testing environment, examiner interprets placing the information onto a stack as passing the intermediate node information to the RUT from the original device component path (e.g., Fig. 12, from the farthest BGP router to the RUT); thus, each possible destination node is exchanged, col. 9,**

Art Unit: 2616

lines 60-65]; and if the message is received from a device component at a lower network layer [in OSPF, lower level LSA advertisements are sent out concerning each router's own network connections, col. 8, lines 57-65]; removing information from the information stack needed to identify a subsequent intermediate device component along the device component path to which the message is to be passed [each OSPF router exchanges "hello" packets to maintain adjacency and LSAs to describe its own network connections and learned routes, col. 8, lines 57-65. Since the information identifying intermediate nodes is extracted via the virtual/testing environment, the examiner interprets removing information from the stack as passing the intermediate node information to the RUT from the original device component path (e.g., Fig. 12, from the farthest OSPF router to the RUT); thus, the current network topology is exchanged, col. 8, line 66 to col. 9, line 4.]. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the router of Zhang et al. to include the specific functionality of the router-testing of Hao et al. because such a testing method would allow the network management system to be properly tested for scalability, performance, and reliability while still not incurring the monetary and time burdens that accompany all the network devices in a network environment [see Zhang et al., col. 1, lines 2, lines 13-25].

11. With regard to claim 7, Hao et al. further discloses using the removed stack information **[the removed stack information is used to generate the LSA to the RUT and test whether the network topology and learned routes, col. 9, lines 8-39].**

Response to Arguments

12. Applicant's arguments filed on December 12, 2005 have been fully considered but they are not persuasive.

13. With regard to claims 1, 2, and 8, Applicant states that Zhang et al. only sends *simulated communications* between network management server [network management server 12] and the simulation device [VNDs 38] [Applicant's Response of December 12, 2005, page 3, lines 24-25]. Applicant then states that Applicant's invention—which *models* a distributed network—performs a path discovery function by modeling network devices (e.g., with software-based agents) wherein a *simulated* network message is sent from a source device component (DC) to a destination DC [Applicant's Response dated December 12, 2005, page 3, line 26 to page 4, line 5]. Applicant explains that all paths *within the model*, from the source DC to the destination DC, are recorded in order to determine a corresponding path from source DC to destination DC, as well as any intermediate devices along the way, wherein all *simulated* communications are between the *model-based DCs* [Applicant's Response dated December 12, 2005, page 3, line 26 to page 4, line 5]. Thus, apparently, Applicant argues that Zhang et al. does not disclose, teach, or suggest sending a *simulated message* from a source DC to a destination DC *within the model* because such simulated communications cannot occur between server 12 (source device) and VNDs 38 (destination devices). Examiner respectfully disagrees.

14. As noted above for Applicant's claims 1, 2 and 8 [paragraphs 4 and 5 above], examiner has interpreted the *simulated communications in the modeled network* to occur between network

Art Unit: 2616

management server 12 and VNDs 38 (*i.e., the modeled network includes at least all the hardware/software between server 12 and VNDs 38*) [Fig.1]. With respect to applicant's arguments that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (*i.e., (a) path discovery function within a modeled distributed network and/or (b) excluding communications between server 12 and VNDs 38 (i.e., the modeled network)*) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

15. Applicant also argues that any claimed DC may communicate directly with other DCs and that such a functional relationship is not disclosed in Zhang et al. (because Applicant states that VNDs 38 are not disclosed to communicate directly with each other) [**Applicant's Response dated December 12, 2005, page 4, lines 14-17**]. Applicant also argues that Zhang et al. does not disclose modeling any network devices and/or does not disclose any communication between network device models [**Applicant's Response dated December 12, 2005, page 4, lines 17-20**]. Specifically, Applicant argues that communication does not occur between server 12 and VNDs 38 [**Applicant's Response dated December 12, 2005, page 4, lines 24**]. Examiner respectfully disagrees.

16. First, as noted above for Applicant's claims 1, 2 and 8 [paragraphs 4 and 5 above], examiner has interpreted the *simulated communications* to occur between network management server 12 and VNDs 38 (*i.e., the modeled network includes at least all the hardware/software between*

Art Unit: 2616

server 12 and VNDs 38) [**Fig.1**]. Thus, each source device (server 12) does, in fact, communicate with a destination device (VND 38).

17. Communication must necessarily occur between network server 12 and VNDs 38. Recall that each simulation device 18 disclosed by Zhang et al. comprises a communication device 36—which can be a router [**or one of several other devices, col. 5, lines 26-33**]**—**which has a physical address, as well as VNDs 38, which have multiple virtual network addresses [**col. 4, lines 7-14**]. Communications can occur between network server 12 and communication device 36 or VNDs 38 via physical addresses or virtual addresses (respectively) [**col. 6, lines 55-60**]. In fact, device 36 and VNDs 38 mirror each other's status and condition in each simulation device 18 [**col. 5, lines 59-60**]. Simulation device 18 can simulate several/multiple network devices 16 [**col. 6, lines 66-67**] and multiple simulation devices 18 can be used to simulate large numbers of network devices 16 or one (or multiples of one) type of network device (s) 16 (e.g., multiple routers or a bridge) [**col. 8, lines 40-57**].

18. Applicant argues that Zhang et al. does not record the device component's path traversed by the message [**Applicant's Response dated December 12, 2005, page 5, lines 2-3**]. Applicant further argues that the MIB 68 cannot comprise information about the of the path traversed by the message because there can be no messages traversed between multiple VNDs 38 [**Applicant's Response dated December 12, 2005, page 5, lines 14-17**]. Examiner respectfully disagrees.

Art Unit: 2616

19. First, as noted above for Applicant's claims 1, 2 and 8 [paragraphs 4 and 5 above], examiner has interpreted the *simulated communications* to occur between network management server 12 and VNDs 38 (*i.e., the modeled network includes at least all the hardware/software between server 12 and VNDs 38*) [Fig.1]. Thus, each source device (server 12) does, in fact, communicate with a destination device (VND 38).

20. Second, the examiner has interpreted that recording the VNDs 38—those which were traversed—onto the management information base (MIB) 68 (when simulation device 18 acts as a router 36)—as recording the component's path. Zhang et al. discloses recording such information as [routing] tables associated with VNDs 38, as well as the status of input/output interfaces [devices] associated with, and communicated to, communication device [router] 36, [col. 5, lines 26-33 and 50-60]. Packetized messages sent to and from the network server 12 and the VNDs 38 comprise alarm data as well as the VNDs' virtual addresses [col. 8, lines 1-10]. The MIB 68 records such information and updates it [*i.e., a routing table*] as well as including additional routing table information such as number of users, status of input and output devices, and any other information that supports the communication of device 36 (VNDs 38) [col. 5, lines 44-47 and 50-60].

Conclusion

21. Accordingly, **THIS ACTION IS MADE FINAL**. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

22. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(a) Blier, Jr., et al. (USP 6,832,184), Intelligent Work Station Simulation—Generalized LAN Frame Generation Simulation Structure.

(b) Rowe et al. (USP 6,915,344), Server Stress-Testing Response Verification.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Mais whose telephone number is (571) 272-3138. The examiner can normally be reached on 6:00-4:30.

Art Unit: 2616

25. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

February 17, 2006

A handwritten signature in black ink, appearing to read 'Frank Duong', with a stylized flourish at the end.

**FRANK DUONG
PRIMARY EXAMINER**